NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

RESIDUE MANAGEMENT, NO TILL AND STRIP TILL

(Acre)
CODE 329-A

DEFINITION

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while growing crops in narrow slots, tilled or residue free strips in soil previously untilled by full width inversion implements.

PURPOSES

This practice may be applied as part of a Conservation Management System to support one or more of the following:

- Reduce sheet & rill erosion.
- Reduce wind erosion.
- Reduce irrigation-induced erosion.
- Improve or maintain water quality.
- Improve or maintain water infiltration and conserve soil moisture.
- Maintain or improve soil organic matter content.
- Manage snow to increase plant available moisture or reduce plant damage from freezing or desiccation.
- Provide food and escape cover for wildlife.
- Maintain or improve agronomic yields.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland and other land where crops are grown, including pasture, hayland, and land used for grass seed production.

This standard includes tillage and planting methods commonly referred to as no till, zero till, slot plant, row till, row till, zone till, or strip till.

CRITERIA

Seedbed preparation, planting, and fertilizer placement shall disturb no more than one third of the row width.

Planters or drills shall be equipped to plant directly through untilled residue or in a tilled seedbed prepared in a narrow strip along each row by planter attachments such as rotary tillers, sweeps, multiple coulters, or row cleaning devices.

Harvest operations will be designed to leave straw standing as tall as possible. Loose residues to be retained on the field, shall be uniformly distributed on the soil surface. Combines shall be equipped with spreaders capable of distributing residue over at least 80 percent of the working width of the header.

Residues shall not be disturbed by full-width tillage operations except when pest infestations exceed defined threshold levels and remedial corrective action is required. Row cultivation or spot treatment for weeds, leveling ruts, or similar operations become necessary, tillage shall be limited to undercutting, (noninversion) operations which minimize burial of surface residue.

Residues shall not be burned except when pest infestations exceed defined threshold levels and remedial corrective action is required as defined in an approved Pest Management Plan.

Residue can be burned without a Pest Management Plan only if the field(s) to be burned is to be immediately reseeded to a sod or cover crop using No-Till technology.

Residue removal activities will not be performed without full evaluation of impacts on soil, water, animal, plants, and air. Reference ID-ECS-001.

Partial removal of grain residue by baling or grazing is allowed on cereal crops (high residue crops) if followed by another high residue crop.

Additional Criteria to Reduce Sheet and Rill Erosion

The amount of randomly distributed, flat residue needed to reduce erosion within the soil loss tolerance (T) or any other planned soil loss objective, shall be

determined using current approved erosion prediction technology, Revised Universal Soil Loss Equation (RUSLE). Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Reduce Wind Erosion

The amount and orientation of residue needed to reduce erosion within the soil loss tolerance (T) or other planned soil loss objective shall be determined using current approved wind erosion prediction technology, Wind Erosion Equation (WEQ). Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Reduce irrigation Induced Erosion

The erosion reduction effectiveness of planned practices shall be determined using current approved furrow erosion prediction technology, Surface Irrigation Soil Loss Model (SISL). Planned or applied systems shall be within the soil loss tolerance (T) or other planned soil loss objective. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed to maintain a positive soil-conditioning index.

Additional Criteria to Maintain or Improve Soil Organic Matter Content

The amount of residue needed to achieve the desired soil condition, shall be determined using the current approved soil conditioning index procedure. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Conserve Soil Moisture

A minimum quantity of 50 percent residue cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed.

Additional Criteria to Manage Snow to Increase Plant Available Moisture or Reduce Plant Damage From Freezing or Desiccation

Stubble shall be left standing as high as possible by the harvesting operation, but not less than 6 inches in any case. Stubble shall remain standing over winter to trap and retain snow. Loose residue may be removed providing that the remaining residue is left standing.

When crops are planted in the fall, the width of the tilled strip or slot shall be no more than one third of the row width, in order to reduce the disturbance of standing stubble.

Additional Criteria to Provide Food and Escape Cover for Wildlife

Residue height, amount, and time period shall be determined using an approved habitat evaluation procedure. Residues shall not be removed unless it is determined by the habitat evaluation procedure that removal would not adversely affect habitat values.

CONSIDERATIONS

Individual conservation practices should be planned as part of a comprehensive conservation plan which addresses all resource concerns on the unit and reaches a Resource Management System level of treatment.

Higher residue levels increase infiltration rates which may affect both surface and groundwater quality. A nutrient and/or pest management plan should be developed if water quality can be impaired.

Where water quality is a concern, a buffer or filter strip should be placed between where the practice is applied and the water resource.

No till or strip till may be practiced continuously throughout the crop rotation, or may be managed as part of a system which includes other tillage and planting methods such as mulch till.

Production of adequate amounts of crop residues necessary for the proper function of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover or green manure crops, and adjustment of plant populations and row spacing.

Maintaining a continuous no till system will improve soil organic matter content. Also, when no till is practiced continuously, soil reconsolidation provides additional resistance to erosion.

The effectiveness of stubble to trap snow or reduce plant damage from freezing increases with stubble

height. Variable height stubble patterns may be created to further increase snow storage.

Increased crop residues on or near the soil surface may result in reduced nutrient availability to plants. Effectiveness of surface applied pesticides may also be reduced in some cases. Residues trap sediment and reduce the amount carried to surface water. Crop residues promote soil aggregation and improve soil tilth.

Where surface water quality concerns remain after application of this practice, consideration should be given to the addition of other sediment retention practices.

Application of animal waste which includes bedding or waste feed can be considered part of the minimum residue requirements.

PLANS AND SPECIFICATIONS

Site specific specifications are developed by the planner for each land unit being planned. Site specific specifications are developed using current prediction and/or evaluation tools, i.e.: RUSLE, WEQ, SISL, Soil Condition Index Rating, etc.

Specifications shall be recorded on print outs of prediction tools, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

Annual maintenance of this practice may be required by certain program or contractual agreements.

REFERENCE

Section 1, Erosion Prediction, Idaho Field Office Technical Guide.

Surface Irrigation Soil Loss Model. Idaho Agronomy Technical Note 21.

Wildlife Habitat Appraisal Guides for Idaho, Biology Technical Note No. 19

Quality Criteria Section III, Field Office Technical Guide.

Soil Conditioning Index Rating, National Agronomy Manual Part 508.